

WHAT IS CLAIMED IS:

1. An image compressing method comprising:
 - a first area separating step wherein by scanning bit map data in a main scanning direction,
5 the data is separated into an area including black pixels and an area including no black pixel on a unit basis of logic rows of a predetermined number as an integer of 1 or more by a first area separating unit;
a first encoding step wherein the area
10 including no black pixel separated by said first area separating step is encoded as an element by a first encoding unit;
a second area separating step wherein by scanning the logic row including the black pixels
15 separated by said first area separating step in a sub-scanning direction which crosses the main scanning direction, the data is separated into an area including the black pixels and an area including no black pixel on a column unit basis by a second
20 area separating unit;
a second encoding step wherein the area including the black pixels which was separated by said second area separating step and in which the number of continuous columns is equal to or more than
25 2 is encoded as an element by a second encoding unit;
a third area separating step wherein an area which coincides with a predetermined reference

pattern in which the number of columns is equal to 1 is separated by a third area separating unit from the areas which were not encoded in said second encoding step; and

5 a third encoding step wherein the area which coincides with said reference pattern and was separated by said third area separating step is encoded by a third encoding unit.

10 2. A method according to claim 1, wherein:

 said reference pattern comprises a plurality of kinds of patterns of a predetermined number selected in order of the pattern whose frequency of appearance is high among the areas including the black pixels in
15 which the number of columns is equal to 1 and which remain without being encoded by said second encoding step; and

 in said third encoding step, the area including the black pixels in which the number of columns is
20 equal to 1 and which was separated in said third area separating step is encoded by using a code showing a pattern number of the coincident reference pattern and a code showing a code type.

25 3. A method according to claim 2, wherein said reference pattern comprises a plurality of kinds of patterns of a predetermined number which have been

selected in order of the pattern whose frequency of appearance is high with respect to the areas including the black pixels in which the number of columns is equal to 1 and have previously and
5 statistically been obtained with respect to the area including the black pixels in which the number of columns is equal to 1 and which is separated in said third area separating step.

10 4. A method according to claim 1, wherein:

said reference pattern is a pattern in which one or a plurality of black pixels in one column are continuously included: and

in said third encoding step, the area including
15 the black pixels in which the number of columns is equal to 1 and which was separated in said third area separating step is encoded by using a code showing positions of the black pixels in one column of the coincident reference pattern and the number of
20 continuous black pixels and a code showing a code type.

5. A method according to claim 1, wherein:

said reference pattern is a pattern in which
25 one black pixel in one column is included; and

in said third encoding step, the area including the black pixels in which the number of columns is

equal to 1 and which was separated in said third area
separating step is encoded by using a code showing
positions of the black pixels in one column of the
coincident reference pattern and a code showing a
5 code type.

6. A method according to claim 1, wherein:
said reference pattern is a pattern in which
one or a plurality of black pixels in one column are
10 included; and
in said third encoding step, the area including
the black pixels in which the number of columns is
equal to 1 and which was separated in said third area
separating step is encoded by using a code showing
15 positions of the black pixels in one column and a
code showing the number of continuous black pixels
and a code type.

7. A method according to claim 1, wherein:
20 in said first encoding step, the area including
no black pixel obtained in said first area separating
step is encoded by the number of rows which are
skipped; and
in said second encoding step, the area
25 including no black pixel obtained in said second area
separating step is encoded by the number of columns
which are skipped, and the area including the black

pixels of two or more continuous columns separated in said second area separating step is separated into a same column pattern, a stairway-like pattern, and a repetitive pattern and encoded, respectively.

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8. An image compressing method comprising:

a first area separating step wherein by scanning bit map data in a main scanning direction, the data is separated into an area including black
10 pixels and an area including no black pixel on a unit basis of logic rows of a predetermined number as an integer of 1 or more by a first area separating unit;

a second area separating step wherein by scanning the logic row including the black pixels
15 separated by said first area separating step in a sub-scanning direction which crosses the main scanning direction, the data is separated into an area including black pixels and an area including no black pixel on a column unit basis by a second area
20 separating unit;

a third area separating step wherein an area which coincides with a predetermined reference pattern in which the number of columns is equal to 1 is separated by a third area separating unit from the
25 areas including the black pixels in which the number of columns is equal to 1 and which were separated in said second area separating step; and

an encoding step wherein each of the areas separated by said first to third area separating steps is encoded as an element by an encoding unit.

- 5 9. A program for allowing a computer to execute:
 a first area separating step wherein by
scanning bit map data in a main scanning direction,
the data is separated into an area including black
pixels and an area including no black pixel on a unit
10 basis of logic rows of a predetermined number as an
integer of 1 or more;

 a first encoding step wherein the area
including no black pixel separated by said first area
separating step is encoded as an element;

- 15 a second area separating step wherein by
scanning the logic row including the black pixels
separated by said first area separating step in a
sub-scanning direction which crosses the main
scanning direction, the data is separated into an
20 area including black pixels and an area including no
black pixel on a column unit basis;

- a second encoding step wherein the area
including the black pixels which was separated by
said second area separating step and in which the
25 number of continuous columns is equal to or more than
2 is encoded as an element;

 a third area separating step wherein an area

which coincides with a predetermined reference pattern in which the number of columns is equal to 1 is separated from the areas which were not encoded in said second encoding step; and

5 a third encoding step wherein the area which coincides with said reference pattern and was separated by said third area separating step is encoded.

10 10. A program for allowing a computer to execute:
 a first area separating step wherein by scanning bit map data in a main scanning direction, the data is separated into an area including black pixels and an area including no black pixel on a unit
15 basis of logic rows of a predetermined number as an integer of 1 or more;

 a second area separating step wherein by scanning the logic row including the black pixels separated by said first area separating step in a
20 sub-scanning direction which crosses the main scanning direction, the data is separated into an area including black pixels and an area including no black pixel on a column unit basis;

 a third area separating step wherein an area
25 which coincides with a predetermined reference pattern in which the number of columns is equal to 1 is separated from the areas including the black

pixels in which the number of columns is equal to 1
and which were separated in said second area
separating step; and

an encoding step wherein each of the areas
5 separated by said first to third area separating
steps is encoded as an element.

11. A computer-readable recording medium which
stores a program for allowing a computer to execute:

10 a first area separating step wherein by
scanning bit map data in a main scanning direction,
the data is separated into an area including black
pixels and an area including no black pixel on a unit
basis of logic rows of a predetermined number as an
15 integer of 1 or more;

a first encoding step wherein the area
including no black pixel separated by said first area
separating step is encoded as an element;

a second area separating step wherein by
20 scanning the logic row including the black pixels
separated by said first area separating step in a
sub-scanning direction which crosses the main
scanning direction, the data is separated into an
area including black pixels and an area including no
25 black pixel on a column unit basis;

a second encoding step wherein the area
including the black pixels which was separated by

said second area separating step and in which the number of continuous columns is equal to or more than 2 is encoded as an element;

5 a third area separating step wherein an area which coincides with a predetermined reference pattern in which the number of columns is equal to 1 is separated from the areas which were not encoded in said second encoding step; and

10 a third encoding step wherein the area which coincides with said reference pattern and was separated by said third area separating step is encoded.

12. A computer-readable recording medium which
15 stores a program for allowing a computer to execute:

a first area separating step wherein by scanning bit map data in a main scanning direction, the data is separated into an area including black pixels and an area including no black pixel on a unit
20 basis of logic rows of a predetermined number as an integer of 1 or more;

a second area separating step wherein by scanning the logic row including the black pixels separated by said first area separating step in a
25 sub-scanning direction which crosses the main scanning direction, the data is separated into an area including black pixels and an area including no

black pixel on a column unit basis;

5 a third area separating step wherein an area which coincides with a predetermined reference pattern in which the number of columns is equal to 1 is separated from the areas including the black pixels in which the number of columns is equal to 1 and which were separated in said second area separating step; and

10 an encoding step wherein each of the areas separated by said first to third area separating steps is encoded as an element.

13. An image compressing apparatus comprising:

15 a first area separating unit which scans bit map data in a main scanning direction, thereby separating the data into an area including black pixels and an area including no black pixel on a unit basis of logic rows of a predetermined number as an integer of 1 or more;

20 a first encoding unit which encodes the area including no black pixel separated by said first area separating unit as an element;

25 a second area separating unit which scans the logic row including the black pixels separated by said first area separating unit in a sub-scanning direction which crosses the main scanning direction, thereby separating the data into an area including

black pixels and an area including no black pixel on a column unit basis;

5 a second encoding unit which encodes the area, as an element, including the black pixels which was separated by said second area separating unit and in which the number of continuous columns is equal to or more than 2;

10 a third area separating unit which separates an area which coincides with a predetermined reference pattern in which the number of columns is equal to 1 from the areas which were not encoded by said second encoding unit; and

15 a third encoding unit which encodes the area which coincides with said reference pattern and was separated by said third area separating unit.

14. An image compressing apparatus comprising:

20 a first area separating unit which scans bit map data in a main scanning direction, thereby separating the data into an area including black pixels and an area including no black pixel on a unit basis of logic rows of a predetermined number as an integer of 1 or more;

25 a second area separating unit which scans the logic row including the black pixels separated by said first area separating unit in a sub-scanning direction which crosses the main scanning direction,

thereby separating the data into an area including black pixels and an area including no black pixel on a column unit basis;

5 a third area separating unit which separates an area which coincides with a predetermined reference pattern in which the number of columns is equal to 1 from the areas including the black pixels in which the number of columns is equal to 1 and which were separated by said second area separating unit; and

10 an encoding unit which encodes each of the areas separated by said first to third area separating units as an element.